in the form of pressure and fulness after meals, and eructations and nausea. The patient has lost twelve pounds in weight. On physical examination nothing abnormal can be detected. After an Ewald test breakfast an average of 248 c.c. of contents was obtained, with a total acidity of 55; free HCl, 0.11 per cent.; specific gravity, 1014; proportion of solid to liquid sediment, 25 to 75; erythrodextrin reaction marked; after a dry test meal an average of 195 c.c. of contents was removed, of a total acidity of 44; free HCl, 0.13 per cent.; specific gravity, 1012; proportion of solid to liquid sediment as 14 to 86; erythrodextrin reaction marked. The patient was entirely relieved of this discomfort by carefully regulating his diet, mode of life, and by the administration of eumydrin.

Case XIV.—J. D., male, aged twenty-nine years, has been suffering with indigestion for over six years. At times he would apparently be perfectly well, but the slightest excitement or worry would occasion much gastric distress. The patient complains of nausea, fulness after meals, and occasional heartburn, together with headaches, insomnia, and great irritability. On physical examination nothing abnormal can be detected. The patient has lost twenty-two pounds in weight. After an Ewald test breakfast an average of 22 c.c. of contents was obtained, with a total acidity of 700; free HCl, 0.16 per cent.; specific gravity, 1008; proportion of solid to fluid sediment, 19 to 81; amidulin reaction present. After a dry test meal an average of 184 c.c. of contents was removed, of a total acidity of 55; free HCl, 0.15 per cent.; specific gravity, 1010; total solid to fluid sediment, 20 to 80; erythrodextrin reaction marked. The treatment of this patient consisted of a carefully regulated diet, exercise, baths, and the administration of belladonna. He was not, however, benefited.

CHRONIC PANCREATITIS.

By Joseph Sailer, M.D.,

ASSISTANT PROFESSOR OF MEDICINE IN THE UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA.

Chronic pancreatitis was carefully described by Fitz[1] in 1887. He even described most of the varieties, and I believe it fair to say, was not less familiar with the symptomatology than we are at the present day. The condition slumbered somewhat peacefully after Fitz's paper, but of late years, very largely owing to the persistent efforts of Mayo Robson[2] and the enthusiasm of the surgeons for new fields of endeavor, it has begun to arouse widespread interest.

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[1] New York Med. Rec., 1890, xxxv, 197.

[2] Hunterian Lecture, 1904; Truhart, Pancreas Pathologie, Wiesbaden, 1908; Leven, Jour. Med. Research, 1907; Guleke, Archiv. f. klin. Chir. lxxviii, 845; Martina, Deutsch. Zeit. f Chirurgie, 1907, lxxxvii; Walko, Münch. med. Woch., 1907, 1460; Dieulafoy, Press médicale, 1907, No. 83.

Our knowledge of chronic pancreatitis, at least so far as its morbid anatomy is concerned, is in a reasonably satisfactory condition. The ordinary form, as in all other forms of chronic inflammation, consists of degenerative changes in the cells and proliferation of the connective tissue associated with round-cell infiltration. The etiology of this condition may vary. Among the known causes are obstruction of the pancreatic duct or ducts, which may be produced by lodgement of a gallstone in the ampulla, first described by Opie;[3] or the presence of calculi in the ducts, commonly composed of calcium carbonate, which are in all cases associated with more or less focal and sometimes with general sclerosis of the pancreas; or the infection, if it may be so called, of the pancreatic tissue by the route of adhesions in its immediate neighborhood; or possibly by the existence of certain general infectious diseases, as the type of chronic pancreatitis described in newborn children suffering from hereditary syphilis. Cysts of the pancreas are also commonly associated with more or less extensive sclerotic changes, and it is possibly the rule rather than the exception that after attacks of acute pancreatitis chronic pancreatitis is apt to develop, as in a case recently reported by Albrecht,[4] which was followed for a year and found to have developed an alimentary glycosuria and a diminished amount of trypsin in the stools. Similar cases have previously been reported. There is also a type of chronic pancreatitis, first described by Ssobolew,[5] characterized by the disappearance of the islands of Langerhans and associated particularly with the severer forms of diabetes. If we attempt, however, to discuss chronic pancreatitis from a clinical standpoint, we find that it is in a deplorable state at the present time. Various observers, particularly surgeons,[6] following the lead of Mayo Robson, have insisted that it is a common condition, but the majority of medical men, even those who have had their attention particularly directed to the subject, have been unable to confirm this statement, and a considerable degree of willingness to diagnosticate morbid conditions of the pancreas has not led to the discovery of any large proportion of patients in whom even a reasonable suspicion of their existence seemed to be justifiable. One need only read the three pages devoted to the symptomatology in the recent work of Robson and Cammidge[7] to realize how indefinite the picture is at the present time. Practically the symptoms resolve themselves into (*a*) some discomfort apparently associated with the stomach, (*b*) evidence of indigestion, (*c*) pain of any degree or variety, sometimes in the neighborhood of the umbilicus and sometimes elsewhere in the abdomen, and, as more definite signs but only occasional, (*d*) jaundice, (*e*) a distended gall-bladder, and (*f*) a more or less evident mass in the region of the umbilicus that can be differentiated occasionally from the stomach.. In addition to these indefinite signs, there are a number of laboratory tests, concerning the accuracy of which there is much difference of opinion, depending largely upon the enthusiasm of the investigator who has studied them.

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[3] Johns Hopkins Hosp. Bull., 1901, vii, 397; Diseases of the Pancreas, 1903.

[4] Wien. klin. Woch., 1909, No. 43.

[5] Centralblatt f. allg. Path. u. path. Anat., 1900, xi, 204. Ohlmacher, AMER. JOUR. MED. SCI., 1904, cxxviii, 287. Opie, loc cit.

[6] Deaver, Trans. College Phys., Phila., 1909; Mayo, Jour. Amer. Med. Asso., April 11, 1908.

[7] The Pancreas: Its Surgery and Pathology, Philadelphia, 1907; Brugsch, Zeit. f. klin. Med., 1906, lvii; Schneider, Münch. med. Woch., 1907, 13; Walko, Archiv f. Verdauung., 1907, xiii; Mayo Robson, Berl. klin. Woch., 1908, Nos. 4 and 7.

Basing my remarks rather upon the study of literature than upon many personal observations, I am inclined to think that we can classify cases of chronic pancreatitis into three clinical types. The first type may be represented by the group of cases in which either as a cause or as a complication of the sclerosis, there is obstruction of the duct of Wirsung and the common bile duct. Among these are particularly the instances of lodgement of a gallstone in the ampulla of Vater. These cases are all characterized by jaundice, sometimes also by distention of the gall-bladder producing a palpable tumor, emaciation, digestive disturbance, and the various changes in the secretions and discharges available for examination, that indicate deficient functional activity of the pancreas. If in addition there is a history of gallstone colic and a palpable mass in the region of the umbilicus, which may also be tender, it would seem that a correct diagnosis should be reached. The second type includes cases in which the swelling of the head of the pancreas is so great that a palpable tumor is present. There may also be jaundice, which frequently is of the most intense character, and the other symptoms that have been described. I do not believe, however, that the diagnosis can be made with certainty, because, until the operation, and in many cases even afterward,[3] there will be doubt whether the case is one of carcinoma of the pancreas or merely a chronic pancreatitis. The third type includes the group of cases, and presumably much the larger group, in which there is neither jaundice nor a palpable mass. At the present time the diagnosis of these cases is exceedingly indefinite and uncertain, and is made either by the surgeon at the time of the abdominal operation by feeling the increased hardness of the gland, or by the clinician as a result of a careful study of all the possibilities, the exclusion of those morbid conditions which might reasonably be suspected, but are not present, and a careful correlation of the symptoms, signs, and laboratory tests that may indicate or suggest impaired functional activity of the gland.

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[3] Glaessner, Deut. med. Woch., 1903, No. 15.

The symptomatology of these forms may be given as follows:

Nutrition is almost invariably impaired and the patient is emaciciated, sometimes to an extreme degree. Digestion is disturbed. There is discomfort after eating, and often this discomfort can be associated with certain articles of food, particularly the carbohydrates. The discomfort does not appear to have any characteristic type. It may be a sense of oppression, or fulness, or of actual pain. Vomiting occurs quite constantly, but it may be only at long intervals. It rarely occurs immediately after taking food unless the condition of the patient is very grave, but may occur in the morning or some hours after taking food, and is usually preceded by some hours of discomfort. Constipation is the rule. Occasionally there are attacks of diarrhœa, but chronic diarrhœa does not appear to occur.

The main factor in the diagnosis is the recognition by some chemical or other test of the insufficiency of the pancreatic secretion. These tests may be divided into the following groups:

1. Those showing disturbances of the internal secretion of the pancreas, if such a secretion exists at all.
2. Those which have to do with the recognition of the existence, in the stomach or intestinal contents, of some of the pancreatic ferments. When they can be demonstrated it is assumed that the pancreas is still functionally active.
3. Those which indicate whether the pancreatic ferments have been discharged into the intestinal tract and have properly digested the food material that has been brought to them.
4. Those which show a disturbance of the carbohydrate metabolism.

Under the first group belongs the dilatation of the pupil after the instillation of adrenalin. This was first suggested by Loew[9] as a clinical test, although it had been used in the physiological laboratory for some time previously (Ehrmann, Meltzer). Personally, I have tested it a number of times, and in the two cases I shall report herewith it was negative. It was distinctly positive in one case of pernicious anemia, but no autopsy was obtained in this case. The Cammidge reaction was negative, and there was no particular reason to suppose that the man had chronic pancreatitis or suppression of the functional activity of the pancreas, although it is entirely possible. In a number of doubtful cases it was also negative, so that among some thirty tests, I have obtained it only once. It is of exceedingly doubtful value.

The second group is more interesting. Volhard,[10] following the lead of the physiologist Boldireff, has attempted to obtain regurgitation of the duodenal contents into the stomach by the administration of large quantities of oil. The duodenal contents are then separated and tested for the presence of trypsin by various methods somewhat more delicate than those commonly employed. The entire literature on this subject has been reported by Farr, together with an elaborate series of experiments. The method is a little difficult, but its difficulties are not prohibitive. The results at present are not sufficiently conclusive or constant for us to base any definite diagnosis upon them.

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[9] Münch. med. Woch., 1907, p. 1411; Bard, Archiv. d. mal. de l'app. digest. et de la nut., 1908, xi.

[10] Münch. med Woch., 1907, 403; Boldireff, Archiv. f. d. ges. Phys., cxxi, 13; Zentralblatt f. ges. Phys. und Path. des Stoff, 1908, No. 3, 209; Farr, Jour. Amer. Med. Assoc., 1910.

Laquer's,[11] method depends upon the recognition of trypsin in the feces. Small portions of the feces are spread upon a Petri dish containing a layer of coagulated albumin and then kept at 55° C. If a depression appears upon the albumin, it is regarded as an evidence of the presence of tryptic ferment. The technique is very simple and the result easily determined, but in one case of surgical pancreatitis the test was positive and in a series of other conditions it seemed to vary in a most haphazard manner. Various other methods have been devised for the purpose of obtaining the duodenal contents, but none are of any clinical value.

The fat splitting ferment has also been sought in the feces, and Opie[12] claims to have found it once in the urine.

The third group of tests is somewhat less satisfactory. Those tests which involve the passage of some substance through the stomach, and its solution in the intestines only if the pancreatic secretion is active, are so excedingly uncertain that they may be dismissed merely with a mention. They include the administration of a substance that can be recognized in the urine, saliva, or feces, such as methylene blue, which stains the urine, or of carmine, which stains the feces; of an iodide, which can be recognized chemically in the urine or saliva; or of a salicylate, which can be recognized chemically in the urine. These are administered in such a manner that they cannot be dissolved in the stomach and presumably only by the active pancreatic juice, the principle enclosures being the glutoid capsule and the salol-coated pill. It is my experience, and I believe it is perfectly safe to assert, that no definite conclusions can be drawn either from a positive or negative result of any of these methods.

At one time it was supposed that the digestion of the nuclei in the muscle fibers was a fairly good test of pancreatic activity. The late Dr. J. D. Steele[13] spent much time and effort in the study of this reaction, and ultimately reached the conclusion that it was of little if any value.

The presence of an excess of neutral fat in the feces (steatorrhœa) is also of uncertain value. The table furnished by Cammidge[14] in his work is sufficient proof of this statement. The presence of a large amount of undigested starch or of undigested meat fiber (azotorrhœa) is also of little value. Somewhat less direct than these laboratory methods is the inability of the patient to take large quantities of carbohydrates without suffering a considerable amount of discomfort.

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[11] Berl. klin. Woch., 1909, No. 19.

[12] Diseases of the Pancreas, 1903.

[13] Univ. Penna. Med. Bull., November, 1906; Schmidt, Arch. klin. Med., lxxxvii, 456.

[14] Loc. cit.

The fourth group of test depends upon the disturbance of the carbohydrate metabolism. The presence of sugar in the urine in the severer forms of chronic pancreatitis appears to be quite common. The presence of alimentary glycosuria, that is, the appearance of sugar in the urine after the administration of 100 grams of glucose, a rather disagreeable dose, appears also to be common, and is a test that should, I believe, be more frequently employed.

The statements regarding the Cammidge reaction[15] are so contradictory and confusing that it is impossible for one who has not done it personally to reach any definite conclusions. It is a reaction very difficult to perform, and, indeed, there have been some who believe that it is not a reaction at all, but merely the result of the different procedures that are necessary in its performance. Even assuming that a reaction exists, there is, I believe, no doubt at the present day that it is not positive but merely suggestive, occurring in many other conditions,[16] particularly achylia gastrica and pernicious anemia.

The treatment of chronic pancreatitis is much disputed. The surgeons have assumed that they only are capable of producing any beneficial results; in other words, that there is no medical treatment.

The surgical treatment consists of draining the biliary passages, in order that, if the pancreatic secretions do not get into the duodenum, at least they do not injure the pancreas by their retention, and of freeing the pancreas of any adhesions that might disturb its functional activity. It is difficult to understand how either measure could favorably effect an advanced sclerosis, but there is no doubt that even when the proliferation of the connective tissue has been so great that the large head of the pancreas has been mistaken for carcinoma,[17] the separation of the adhesions or even sometimes merely an exploratory operation has brought about great relief.

The medical treatment is symptomatic and specific. The symptomatic treatment consists exclusively in the improvement of digestion. The gastric contents should be studied and restored, if possible, to approximately their normal reaction. Food should be easily digestible, and it may be necessary to give a diet similar to that used in diabetes. Constipation should be combated by laxatives or enemas.

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[15] Loc. cit.

[16] Kreinitz, Archiv f. Verdauung., 1909, xv, 53; Speese and Goodman, Trans. College Phys. Phil., 1908, xxx, 167; Eloesser, Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1907, xviii, Heft 2.

[17] Glaessner, loc. cit.

The specific treatment consists in the administration of substances designed to supply the missing or defective pancreatic secretion. Carnot[18] is so confident of the efficiency of his therapy that he regards failure to improve after its administration as evidence of the non-involvement of the pancreas. These substances are all preparations of the gland itself. It must be remembered that the preparations of different makers vary extraordinarily in efficiency. Some of the so-called extracts of pancreas, pancreatin, trypsin, etc., are practically inert, and none of them have a proteolytic activity comparable to that of scale pepsin. All the commercial preparations, moreover, are contaminated with bacteria, chiefly Bacterium coli. They must, moreover, be administered in such a manner that they are not destroyed by the gastric secretion, because as soon as the pancreatic secretion is brought in contact with the gastric secretion, its activity is permanently lost. For this reason they are given in very much the same way as various test substances; that is to say, either in salol-coated pills or glutoid capsules. The salol-coated pills are objectional because they are very large and very hard to swallow, and leave a painful sensation in the esophagus persisting for several hours. The glutoid capsules, on the other hand, are similar in size and ease of swallowing to the ordinary capsule. After a little experimentation I devised a method of preparing the glutoid capsule which is simple and apparently efficient. The ordinary gelatin capsule was employed, and as soon as it was filled a camel's-hair brush dipped in melted gelatin or hot water was passed around the line of union of the two parts. As soon as this dried the capsule was immersed in pure formalin for three minutes, and then thoroughly washed. Such a capsule filled with carmine stains the feces if given twenty hours before the movement, but it will remain in acid gastric juice in an incubator for twenty-four hours without showing any signs of softening.

The following cases have been under observation respectively for two years and one year:

CASE I.—Mrs. S., aged fifty-four, white, had complained of severe indigestion for over a year. The symptoms were pain, often very severe, two hours after eating, eructation, regurgitation of food, and occasional vomiting. There was a feeling of weight in the abdomen, and the bowels moved only with laxatives. Twenty years ago she had a series of attacks lasting for a period of three or four months. They occurred about once a month and consisted of a gradually increasing pain, which ultimately required morphine. The duration usually

[18] Mal. du pancreas, Paris, 1907; Wohlgemuth, Münch. med. Woch., 1907, 147; Fischer and Hoppe, Münch. med. Woch., December, 1907; Bense, Orvise Helilap, 1907, 726 (Abstract Zentralblatt d. ges. Stoffw., 1908); Myers, Zeit. f. exper. Path. und Ther., iii, 580.

was two or three hours. Two years ago the climacterium occurred. For the last ten months there have been occasional attacks of severe pain, colicky in character, in the region of the umbilicus, during which she is compelled to lie down and draw up the legs and occasionally to induce vomiting. She has noted that any indulgence in starchy foods or sugars is followed by very severe pain in the abdomen. The interesting features of the examination were a sense of resistance just above the umbilicus, marked tenderness upon pressure from the umbilicus to the xyphoid, and a spot of extreme tenderness one inch above the umbilicus and one inch to the right of the median line that sometimes disappeared if during the pressure the patient took a deep inspiration. The right kidney was in the second position and freely movable. The blood was normal. The stomach contents showed a moderate reduction of the total acidity and plenty of free hydrochloric acid. The urine was negative to the ordinary tests, and particularly did not contain albumin nor sugar. Her weight was one hundred and seventeen pounds, and she was five feet seven inches tall. The character of the pain simulating so exactly gallstone colic, the tenderness over the position usually occupied by the head of the pancreas, and the absence of tenderness over the gall-bladder led to the suspicion of pancreatic calculus. Dr. Pancoast made two plates, on both of which a small circumscribed shadow was found resembling that of a renal calculus in the supposed situation of the head of the pancreas. He did not think it could have been a calculus of the kidney, gall-bladder, or gallducts, because of the situation. Dr. Goodman examined the urine for the Cammidge reaction, which was positive, and the stool for neutral fat, which was normal. A single test for alimentary glycosuria was positive. The patient suffered greatly after taking the glucose. The Loew pupillary test was negative. The patient was placed upon five grains of extract of pancreatic gland in glutoid capsules, one after each meal. Before this was done her weight had gone down to one hundred and thirteen and one half pounds. From that time the progress was almost uninterrupted. There were a few attacks of pain, but she gained from one to two pounds per week, and now weighs one hundred and forty-eight pounds in about the same clothing that she wore when she first came to my office. She suffers practically no discomfort, and is exceedingly active in social and philanthrophic work. No other treatment excepting a brief course of massage has been employed. She has not rested or restricted her diet, and of course she is able to eat much more than before beginning the treatment.

Case II.—Mrs. M. H., aged thirty-five years, white. In early adult life she had an ischiorectal abscess cured by operation. At the age of twenty-nine blood was occasionally observed in the stools. At the age of thirty-one there was an attack of severe pain in the abdomen, with vomiting. An operation was performed and an incision was made about three inches long on the right side of the abdomen. The surgeon reports that the examination showed only enlargement and hardening of the pancreas, and the incision was closed. Four weeks before admission to the hospital, that is four years later, a fistula formed in this incision, from which fecal matter and bloody mucus were discharged from time to time. The patient had much pain in the abdomen. The appetite was lost and there was nausea and vomiting of practically everything. She could sleep only under the influence of morphine. At this time she was under the care of Dr. William Evans, with whom I saw her in consultation. He suggested that she be admitted to the Presbyterian Hospital on the service of Dr. H. R. Wharton. The examination showed some resistance just above the umbilicus, but no definite mass, and considerable induration in the right lower quadrant around the sinus. There was considerable tenderness in this region, and diffuse tenderness over the lower portion of the abdomen. The patient was extremely emaciated and pale. There was a loud systolic murmur at the pulmonic cartilage. After admission to the hospital, the urine was examined and found to contain sugar, and Dr. Goodman reported that the Cammidge test was intensely positive. The patient was therefore given extract of pancreas in glutoid capsules. She improved very rapidly. The fistula closed, reopened, and again closed, apparently permanently. The sugar disappeared from the urine, and fifteen days after her admission the report was practically negative. A second Cammidge test, however, was not done. On admission, the red blood cells were 2,930,000. Her weight on August 28 was eighty-five and one-half pounds, and on September 8 it was ninety-six pounds. At this time she was up and about the ward, taking a regular house diet, seemed strong, and felt very well. She said that when she omitted the capsules on one occasion for two days, she felt very uncomfortable in the abdomen, and her nausea returned. She was discharged on October 16, eleven weeks after her admission, practically well. I have since heard from Dr. Evans that she discontinued taking the capsules, but that her condition remained satisfactory.

Although the results in these two cases have been apparently excellent, I have endeavored to keep clearly in mind the fact that no definite conclusions can be based upon two cases, and that the improvement may have been independent of the treatment. I cannot understand how the administration of the extract of the pancreas, which at most can be regarded merely as a substitute for the pancreatic secretion, could bring about any improvement in the actual condition of the pancreas itself, and therefore I do not know why both patients have been able to discontinue the use of the capsules without any apparent tendency to relapse; neither do I understand why such a small amount of extract of pancreas, with its low proteolytic activity and its very moderate digestive power, should so completely substitute for the supposed indispensible pancreatic ferment that the patients are able rapidly to increase in weight and strength. It is conceivable that there are other factors involved, possibly ferments or neutralizing bodies of whose existence we are at most suspicious, but to assume their existence in order to explain our results is simply piling theory upon theory. At best, therefore, we can only conclude that in the present instances the administration of extract of pancreas appears to have improved the patients, and that its use at the present time must be largely empirical, although there is a possibility of a certain degree of substitution taking plaec.

Recently an acute intestinal obstruction due to an incarcerated hernia made it necessary to open the abdominal cavity of the second patient again. The desperate condition of the patient precluded any thorough examination, but the surgeon noted that the gall-bladder was distended, and he was uncertain about the size and hardness of the head of the pancreas. The patient made a good recovery, and it is possible that latter a cholecystenterostomy will be considered.

CONGENITAL HEART BLOCK OCCURRING IN A FATHER AND TWO CHILDREN, ONE AN INFANT.

By Z. M. K. Fulton, M.D.,
SURGEON TO ST. CHRISTOPHER'S HOSPITAL FOR CHILDREN, AND TO THE OUT-PATIENT DEPARTMENT OF THE EPISCOPAL HOSPITAL.

Charles F. Judson, A.B., M.D.,
PHYSICIAN TO ST. CHRISTOPHER'S HOSPITAL FOR CHILDREN, AND TO THE OUT-PATIENT DEPARTMENT OF THE CHILDREN'S HOSPITAL OF PHILADELPHIA.

AND

George W. Norris, A.B., M.D.,
ASSOCIATE IN MEDICINE AT THE UNIVERSITY OF PENNSYLVANIA; ASSISTANT VISITING PHYSICIAN TO THE PHILADELPHIA GENERAL, AND THE UNIVERSITY HOSPITALS;
PHYSICIAN TO THE OUT-PATIENT DEPATRMENT
OF THE PENNSYLVANIA HOSPITAL.

Our purpose in this paper is to present briefly the subject of bradycardia and to report three cases in one family, one of them an infant, as instances of heart block, and to show the influence of heredity.

Slow pulse may be physiological, toxic, or infectious, or associated with disease of the arteries, valves, or myocardium. Vagus neuritis, pressure on the vagus, and reflex or direct stimulation of the pneumogastric center in the medulla are occasional causes of bradycardia. Diseases of the spinal cord, pons, or medulla may lead to pressure on the vagus; bradycardia may be found in cases of brain tumor,